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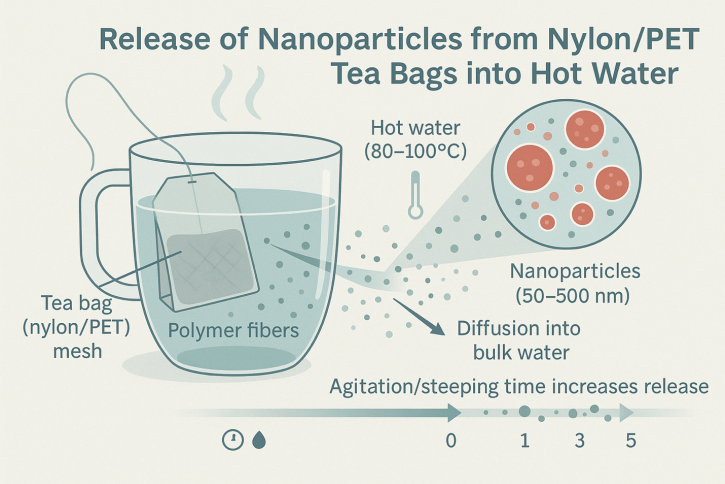
Nanoparticles in Tea Bags Pose Emerging Health Risk, Experts Warn



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Multan, November 10– Researchers from the Department of Soil and Environmental Sciences at MNS-University of Agriculture, Multan, have raised concerns about the growing health risks associated with nanoparticles released from plastic-based tea bags during brewing.

The study, led by Muzhaifa Baloch, Akash Ather, and Dr. Muhammad Arif, highlights that modern

tea bags made from nylon or polyethylene terephthalate (PET) can release billions of micro- and nanoparticles when steeped in boiling water. According to scientific evidence, a single plastic tea bag at 95°C may release approximately 11.6 billion microplastics and 3.1 billion nanoplastics into one cup of tea—levels far higher than those found in most food items.

Nanoparticles, typically less than 1000 nanometers in size, are known for their ability to interact with biological systems at the cellular level. While these properties make them valuable in industrial and medical applications, unintentional ingestion poses serious health concerns. Once inside the body, micro- and nanoplastics can accumulate in tissues and potentially trigger cellular damage, inflammation, and genotoxicity, increasing the risk of respiratory, digestive, and neurological disorders.

Given Pakistan's exceptionally high tea consumption—averaging 1.2 kilograms per capita annually—experts warn that the population may be particularly vulnerable to long-term exposure if plastic-based tea bags remain in use.

The researchers recommend adopting biodegradable or paper-based alternatives to reduce health and environmental risks. They also emphasize the need for public awareness and eco-friendly packaging policies to safeguard consumers.

"Tea is a cherished part of our culture," said Dr. Arif. "Ensuring that it remains safe for everyone

requires informed choices and responsible manufacturing."